INVESTIGATION OF VOLTAGE PROFILE IN LOW VOLTAGE DISTRIBUTION NETWORK

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Abstract

Rural Electrification (RE) development constitutes construction of new substation with the capacity of 100 kVA to 160 kVA with MV feeding of 1 to 3 km. RE scheme covers one village or sometimes several villages. The Low voltage lines which are constructed along the roads in the village feeds the houses of the villagers. In the past after constructing a RE scheme, LV lines are added without considering the voltage drops even though CEB has to follow voltage regulation limits according to the Electricity Act. As a result just after the construction of RE schemes the villagers experience the voltage drops which results in not fully achieving the objectives of rural electrification. Several years ago CEB with the agreement of GOSL the lengths of LV feeder from the transformer substation was limited to 2.5 km. After a study CEB found that this length is also bigger and it causes voltage drops and Low Voltage side loses and decided to limit it to 1.8 km. This limit affect the development of rural electrification in the country because after every 1.8km feeder length, transformer substation is needed to be constructed.

There is no proper tool or method to decide the lengths of LV lines considering the consumption of the village houses. This study develops a tool to guide the Rural Electrification Engineer to decide the LV line length in RE schemes considering the consumption pattern and the consumer distribution in the village minimizing voltage drops & power loses and providing electricity to maximum number of houses of the villagers.